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RESEARCH ARTICLE

Research on the Identification Strategy of Abnormal Trading Behavior in Financial Markets Based on Artificial Intelligence

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ABSTRACT

In this paper, we first start from the abnormal behavior of financial transactions, the concept of artificial intelligence and the defense model of artificial intelligence to get the characteristics and types of abnormal behavior in financial transactions. According to the obtained financial transaction behaviors, artificial intelligence technology is used to establish an identification model, set up a comprehensive function of cost and benefit, and detect the amount as the key feature variable. Simulate the behavioral path of abnormal traders to facilitate subsequent supervision and processing. Classify the behavior of different amounts of transactions, set appropriate standards, complete the detection of small amounts of transactions, and eliminate the behavior of abnormal transactions. The results show that the artificial intelligence algorithm is more efficient in monitoring, which can reach 100 seconds and 2M sides. The accuracy is higher, around 83.83%, and the memory occupation is the lowest, 273MB.The recognition strategy based on artificial intelligence can accurately identify the abnormalities in financial transactions, prevent the risks in financial transactions, improve the security index of financial transactions, and maintain the balanced development of the financial market.

INTRODUCTION

In the era of rapid development of science and technology, artificial intelligence technology has gradually matured and been applied to various fields, especially in the financial field [1-2]. The traditional financial field has limitations such as efficiency and professionalism due to manual processing, which cannot accurately and timely identify abnormalities in the transaction process, so artificial intelligence methods are introduced to reduce the risk of financial transactions and improve the efficiency of transactions [3-4]. Artificial intelligence technology mainly integrates deep learning, machine learning and language processing, and completes daily work through computer processing and analyzing ability, so as to improve the efficiency and accuracy of work. The use of artificial intelligence technology to deal with financial transactions, not only processing speed, but also able to timely find abnormalities in the transaction, reduce people's losses, maintain the development of the financial market, enhance the ability of the financial sector to resist risks, has a high research value [5].

This paper first analyzes the common abnormal behaviors in financial transactions, and studies the concept of artificial intelligence and the defense mode of artificial intelligence, so as to derive the characteristics of abnormal behaviors in financial transactions. Secondly, according to the behavior of financial transactions, it analyzes the money laundering routes and ways of transaction abnormal people, and uses artificial intelligence technology to construct a recognition model, which is used to identify the possible abnormalities in financial transactions and ensure the safety of people's

property. Finally, the artificial intelligence model is divided into large amount and small amount of transaction abnormality identification according to the amount of money, which improves the accuracy of identification, eliminates the transaction abnormality from the root, maintains the balance and fairness of the financial market, ensures the environment of people's money transaction, prevents the invasion of the illegal organization, and promotes the positive development of the financial market.

2. RELATED WORKS

In the use of artificial intelligence to identify the abnormal behavior of the financial market, Sun, Q. et al. will use artificial intelligence technology to identify the transaction behavior of the Internet's finance, analyze the relationship between the elements of the two, so as to solve and identify the abnormal behavior that occurs in the finance, and reduce the financial risk. According to the experiment, the external technology risk score is 0.118, the industry-level risk score is 0.258, and the financial business risk score is 0.407, which can be seen that the artificial intelligence technology has a better effect on the identification of abnormal behavior in financial transactions [6]. Cohen, G. et al. use artificial intelligence technology to analyze and identify abnormal behavior in financial transactions, once abnormal behavior occurs in financial transactions, artificial intelligence technology will remind in time, so as to reduce the risk in the financial field and reduce people's losses. The results show that the artificial intelligence technology has a better effect on the identification of abnormal behaviors in finance, which can find the abnormal financial behaviors in time and reduce the risk of finance [7]. Boustani, N. et al. proposed a machine learning model which is to supervise the behaviors in financial transactions in order to alert the abnormalities in finance in time, to assist people's work, and to enhance the ability of the financial industry to resist risks. From the experiments, the model can realize the recognition of abnormal behavior in finance, and the recognition effect is good [8]. Shao, J. et al. first analyze the current financial situation and financial transactions, and collect corresponding data. Secondly, the artificial intelligence technology is used to build a model based on the collected data, so as to identify abnormal behaviors in finance and alert the abnormalities of financial transactions in time. Finally, it is concluded that the established model can identify abnormal behaviors in financial transactions and reduce the risks in the financial field [9]. Markowitz, H. et al. firstly research and analyze the anomalies in finance to get the characteristics of anomalies behavior. Secondly, artificial intelligence technology is used to construct a financial anomaly identification model, which analyzes and identifies the anomalies in financial transactions, reduces the anomalies in finance, and makes the financial market more fair and transparent. Finally, the performance of the model is tested, and it is concluded that the model is better for the identification of financial anomalies, with a high accuracy rate, and promotes the positive development of the financial market [10]. Zhang, Q. et al. proposed a model for checking financial anomalies with a random forest algorithm, which collects anomalous behaviors in financial transactions and extracts features of the anomalous behaviors. The identification of financial anomalies is carried out according to the features, which reduces financial anomalies, reduces the loss of property, protects people's property, and brings convenience to people's life [11]. Krishnavardhan, N. et al. provide a deep learning approach based on stacked time convolutional network technique as a way to identify anomalous behavior in financial transactions. The model focuses on improving the efficiency and accuracy of existing detection methods in the context of big data. And feature selection is performed to solve the problem of selecting the best features to reduce the side effects of the model, improve the accuracy of the recognition and reduce the risk in the financial industry [12].

3. Artificial Intelligence-based Financial Abnormal Behavior Recognition

3.1 Unusual behavior in financial transactions

Due to the upward trend of economic development in recent years, activities in the financial field are more frequent, and more and more problems have arisen in financial transactions, and there are often many cases of unusual transactions, as follows:

(1) the abnormal behavior of financial transactions, money laundering is the most common one, mainly will be illegal to get the money co)law deposited into the bank, but a large amount of cash deposits need to be reported in advance, so money laundering groups usually cash transported to other countries, and then take advantage of the difference in the law, will be deposited in the bank, this situation is generally more rampant again in the Southwest region, and the need for external intervention in order to solve the problem.

(2) There are many money laundering groups can not transport cash to other countries, can only be dispersed into different amounts of cash, gradually stored in the bank, so as to avoid the attention of the institution, for this case, financial institutions are generally based on the rules of cash transfers in and out of the development of the screening, to determine the object of suspicion [13-14].

(3) Many money laundering groups operate their own catering and service industries, the use of these enterprises to invest in the way, the money obtained illegally to the business operations, so that the money into legitimate income, into the normal operation of the proceeds of this situation, financial institutions can be based on the rules of the transaction amount and the registered capital does not match to start judging.

(4) Because of the antiques and art belongs to the liquidity of the commodity, there is a strong ability to realize, money laundering group through this way of money laundering is more convenient, and even if the use of a higher amount of cash will not introduce attention to the higher safety coefficient, so many money laundering group will choose to buy antiques and art will be illegal income into legal goods.

(5) For some money laundering groups, the fastest and most convenient way to turn illegal income into legal income is to register shell companies and use the company to conduct virtual transactions. However, the cost of this money laundering method is relatively high, so there are still some groups that will choose to establish underground money changers as a way to transfer cash out to foreign countries, which is a common way of transnational money laundering.

(6) Currently many banks have online services that can provide users with consumption and transfer behavior, which has also become a way of money laundering group money laundering. The use of online virtual coins and game point cards and other currencies circulating on the Internet for money laundering activities, illegal income into legitimate income, to avoid the inspection of financial institutions.

3.2 Application of Artificial Intelligence in Security Defense

The rapid development of information technology in the 21st century has also created an environment for the wide application of new-generation information technology such as the Internet of Things, artificial intelligence and big data, and the above technologies have been popularized in various industry sectors. Although advanced technology promotes the development of the industry, but for the operation of the system, but also to the privacy of data protection, network security protection and other challenges, if the system is facing a virus invasion, will be through the system program rapid replication, dissemination, resulting in serious harm. Under this premise, the application of artificial intelligence technology, through intelligent technical means to eliminate potential security risks in cyberspace, reduce the probability of important documents and

information being modified, deleted, and the information space to be physically damaged, is the focus of network security protection at this stage [15].

In order to give full play to the application advantages of artificial intelligence technology, the construction of cyberspace security defense system needs to be carried out on the basis of artificial intelligence technology. Figure 1 shows the architecture of the artificial intelligence cybersecurity defense system, which consists of the target layer, criterion layer, sub-criterion layer, and object layer. The specific content includes:

(1) The target layer is mainly information system security, and plays a guiding role for the other 3 layers.

(2) The criterion layer consists of security physical environment, security communication network, security area boundary, security computing environment, and security management center.

(3) The sub-criteria layer consists of electromagnetic protection, encrypted communication, intrusion prevention, trusted authentication, and security audit, which are the means of implementation to ensure the security defense of cyberspace.

(4) The object layer includes each information system, and is closely related to other layer components.

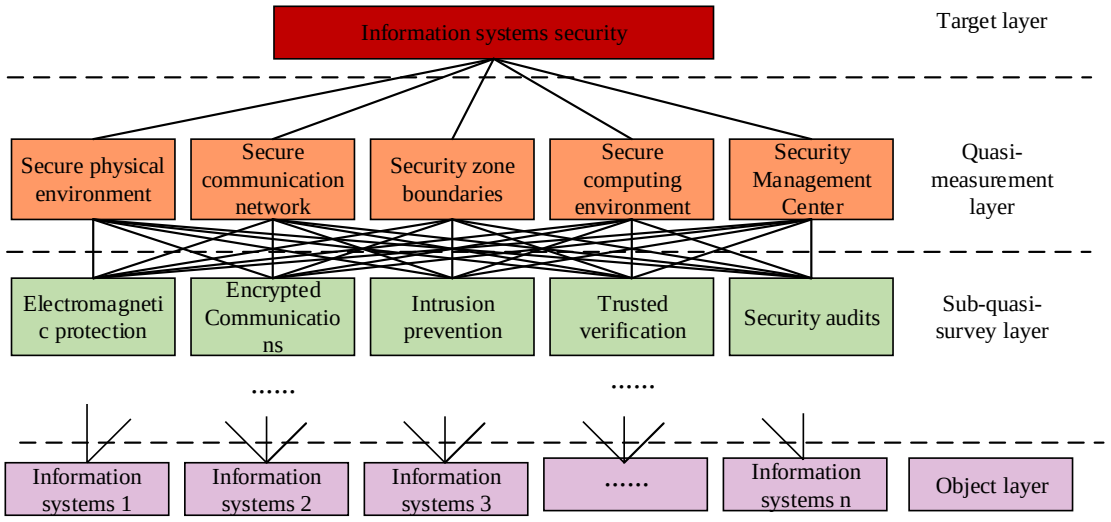

Figure 1: AI cyber security defense system architecture

3.3 Practicality of Artificial Intelligence Technology

Artificial Intelligence is the process of having computers simulate the human mind and then having the computers perform the more dangerous activities instead of the people. By analyzing various production activities, it has been found that there are many high-risk jobs in which the staff is likely to have various accidents during the completion of the task. In order to avoid this problem, artificial intelligence should be utilized to complete these high-risk jobs instead. In the protection of staff life safety at the same time to improve the efficiency of work through the way of thinking simulation, in the process of information processing, thinking change, so as to meet the actual needs of information processing, artificial intelligence workflow as shown in Figure 2. Compared with traditional technology, artificial intelligence is more humane, and has many application advantages, the actual application of the stability is relatively strong, and can realize the dynamic system upgrade.

Figure 2: Artificial intelligence workflow

In addition, artificial intelligence has a strong reasoning ability. Figure 3 shows the characteristics of artificial intelligence, which is capable of extracting the underlying data and processing them, as well as constructing databases and integrating them with big data, so as to deeply mine the data and process them with high quality.

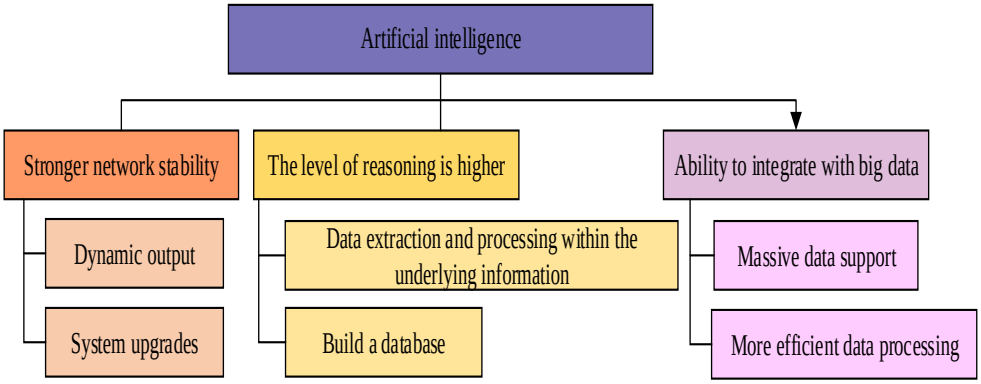

Figure 3: Artificial Intelligence Characteristics

4. Strategies for Identifying Abnormal Trading Behavior in Financial Markets

4.1 Financial network models

Financial network refers to the route and way of capital flow in the financial field, and the defense of financial network can avoid the impact of financial industry and ensure the safety of people's property. The financial network is usually divided into two parts, one is the financial business such as credit support, transfer and settlement, and the other is the financial supervision and management and independent economic activities [16-17].

Financial network as shown in Figure 4, investors are the basic units and nodes, and investors with more funds will become the decision makers of the nodes, can independently choose the bank and region of the account, control the flow of funds and the frequency of the flow of funds, etc., used for higher control power. And the financial network also due to the huge number of nodes, can support a series of deposit and withdrawal behavior, complete the inflow and outflow of funds.

Since the financial network contains more accounts and different types of accounts, it is necessary to categorize the accounts according to the nodes, so as to complete the flow of funds between different types of accounts in the financial network, and through the flow of funds to realize the transaction in the commodity market and participate in the capital activities, which forms a complex financial network.

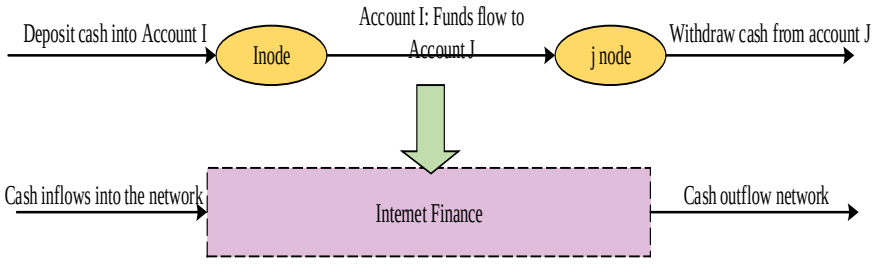

Figure 4: Financial networks

4.2 Psychological analysis of anomalies in financial networks

In the financial transactions, often appear to the funds to carry out abnormal transfer of people, this kind of people's behavior is usually related to the interests of the benefits and costs of the analysis, choose to their own interests to do things, so become money laundering people. Money launderer money laundering process is the bank and money launderer competition process, and the bank in the information is often asymmetric, resulting in money launderers have called more advantages. This situation often makes the anti-money laundering organization is in a passive state, only according to the traces of money laundering people to find financial transactions in the abnormal, reduce the occurrence of money laundering behavior. But many professional money laundering people will use their own financial and computer knowledge to help other people money laundering, for illegal organizations to provide a lot of convenience, because of these needs, money laundering people will also risk a certain amount of money laundering to help them to maximize the benefits.

The goal of money launderers is not only to maximize profits, but also to maximize benefits. Money laundering as a crime, in the upstream crime, money launderers pursue the maximization of benefits, hoping to collect more money. There are also some money launderers will target how to convert illegal funds into legal funds, even at the expense of more money to achieve this present, so as to complete the maximization of benefits, and money laundering success in the investment into the legal field, the pursuit of the maximization of utility [18-19].

4.3 Calculation of the utility of funding anomalous behavior

According to the model of the financial network mentioned above and the psychology of money launderers, the flow chart of financial abnormal behavior can be analyzed, and Figure 5 shows the financial network of money laundering. The starting point of the disassociation stage is set as S_y, with (S_x, S_{x+1}) representing the m rd money laundering session, the money launderer successfully washed out $q_{x-1}^{(S_y,m)}(S_x, S_{x+1})$ of the funds, money laundering success of the benefits of satisfaction for $U_{x-1}^{(S_y,m)}(S_x, S_{x+1})$, the use of money laundering the number of benefits function f_1 and money laundering cost of the negative benefit function f_2 ($f_2 \le 0$) combined into a comprehensive function $U_{x-1}^{(S_y,m)}(S_x, S_{x+1})$.

Set the cost and benefit of the combined function and the number of successfully laundered funds formula is as follows:

$$U_{x-1}^{(S_y,m)}(S_x, S_{x+1}) = f_1\left(q_{x-1}^{(S_y,m)}(S_x, S_{x+1})\right) + f_2\left(C^m(S_y)\right) \quad (1)$$

$$q_x^{(S_y,m+1)}(S_{x+1}, S_{x+2}) = q_{x-1}^{(S_y,m)}(S_x, S_{x+1}) - C^m(S_y) \quad (2)$$

The total benefit function $U(Q)$ for money laundering is as follows:

$$U(Q) = \sum_{m=1}^{L}\sum_{y=0}^{N}\sum_{x=0}^{N} U_{x-1}^{(S_y,m)}(S_x, S_{x+1}) = \sum_{m=1}^{L}\sum_{y=0}^{N}\sum_{x=0}^{N} f_1\left(q_{x-1}^{(S_y,m)}(S_x, S_{x+1})\right) + \sum_{m=1}^{L}\sum_{y=0}^{N}\sum_{x=0}^{N} f_2\left(C^m(S_y)\right) \quad (3)$$

Where L represents the maximum number of transactions, and if $x = 0$, the subscript is -1, representing money laundering from point S_0. In the process of money laundering, if the money launderer does not launder money, the benefit received is negative. If the amount of money is smaller, the cost paid is lower and the benefit received is less. If there are accidents during the money laundering process, resulting in part of the money not being laundered, the benefits will be lower. So

the money launderer will have a reasonable money laundering interval in money laundering, to ensure that after their own money laundering, the benefits will not be reduced.

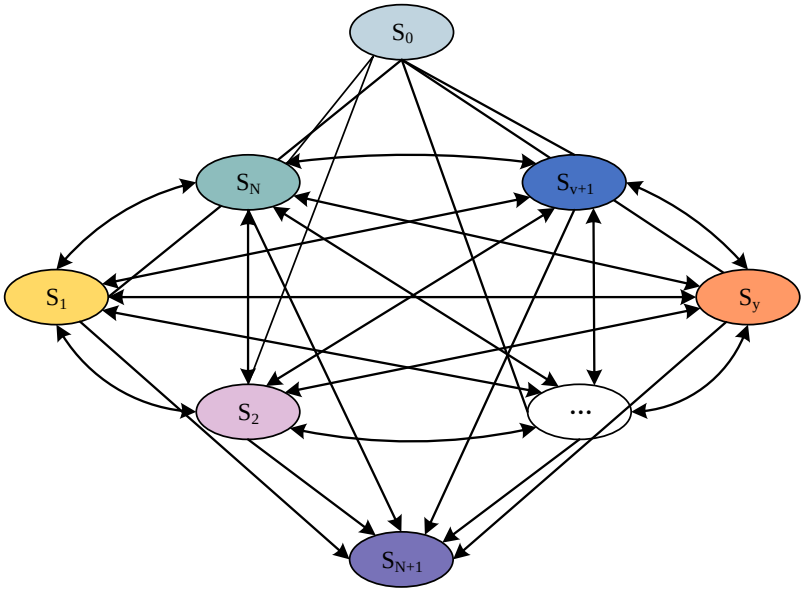

Figure 5: Money Laundering Financial Network

4.4 Behavioral Path Options for Abnormal Actors to Avoid Regulation

The money laundering path of the money launderer refers to the total length of the money launderer along a certain line for money laundering, that is, the ways and means of money laundering, the money laundering path as shown in Figure 6.

Due to the money launderer's money laundering method is more complex, so the distance of the money laundering path can not be expressed by S_0 point to S_{N+1} distance, the second is the need for different standards to unfold the calculation, the specific standards are as follows:

(1) With the actual number of conversions $R_1(m)$ to expand the calculation, the money launderer money laundering process of the actual number of conversions expressed in m + 1. From the above money laundering path, S_0 points to S_6 points transferred 5 times, then $m=5$, S_0 points to S_{N+1} points transferred 6 times, can be derived from the flow of funds distance or money laundering distance of 6. If the money launderer in the process of money laundering, its intermediate links are only 1 node, then $N=1$, it can be derived from the path for:

$$R_1(m)=m+1 \tag{4}$$

(2) Expand the calculation with the probability value of the conversion $R(m)$, for example, S_0 points to S_{N+1} points transferred 6 times, but it is not certain that the money launderer will have to follow the prescribed line to transfer to S_6, and then transfer from S_6 to S_{N+1}. Since the transfer and storage of each node in the financial network is not certain, it is possible to use the probability of the money launderer's distance of money laundering. Therefore, the probability from point S_0 to point S_{N+1} is used as the distance $R_2(m)$ of the money laundering path, which is expressed as follows:

$$R_2(m)=\sum_{k=0}^{m}p^{k-1}\left(S_{y-1},S_y\right)p^{k}\left(S_y,S_{y+1}\right)+1 \tag{5}$$

where if $k=0$, then $p^{k-1}\left(S_{y-1},S_y\right)=1$.

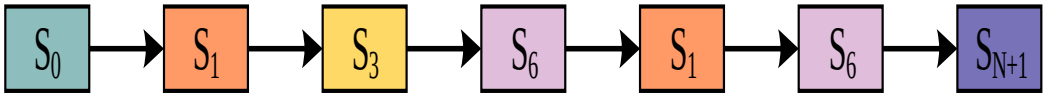

Figure 6: Money Laundering Pathways

Let the possibility of transferring money from node S_y to other nodes be denoted by $1/(N-1)$. Then S_y cannot transfer money to other $N-1$ nodes other than to node S_0 and itself, which gives the path distance $R_2(m)$ from point S_0 to S_{N+1} as:

$$R_2(m)=2 \tag{6}$$

If the money launderer has only 2 intermediate nodes in the money laundering process, then $N=2$. The probability of an intermediate node turning to another intermediate node is 1, which means that it can only turn to one node, then $R_2(m)$ is:

$$R_2(m)=\sum_{k=0}^{m}p^{k-1}\left(S_{y-1},S_y\right)p^{k}\left(S_y,S_{y+1}\right)+1=\frac{(N-1)^m-1}{N(N-1)^{m-1}(N-2)}+1 \tag{7}$$

If the money launderer is laundering money with intermediate node $N\geq 3$, then $R_2(m)$ is as follows:

$$R_2(m)=\sum_{k=0}^{m}p^{k-1}\left(S_{y-1},S_y\right)p^{k}\left(S_y,S_{y+1}\right)+1=\frac{(N-1)^m-1}{N(N-1)^{m-1}(N-2)}+1 \tag{8}$$

Based on the above process, it can be concluded that if the conditions of cost constraints are satisfied, that is, when $\max U(Q)$ is realized, $R_1(m)$, $R_2(m)$ expressed in terms of the number of transfers obtained m is the shortest money laundering distance of the money launderer, and the path through which $m+1$ transactions have been carried out is the optimal path for the money launderer.

4.5 Identification of unusual transaction amounts

At present, the existing anti-money laundering data report is based on the transaction amount of the preset threshold to start the development, if the amount of the transaction is greater than the set threshold, then the amount of money will be investigated and regulated, so the set amount of the detection of money is a key characteristic variable that affects the management of money laundering behavior.

If the transaction amount of the trading account is too large, the amount of the account can be set to the state of approximate obedience, denoted by $X\sim N\left(\mu,\sigma^2\right)$. According to the statistical theory, it can be derived that the mean value of the account's transaction amount is:

$$\mu=\frac{1}{n}\sum_{i=1}^{n}x_i \tag{9}$$

The variance of the account transaction amounts is as follows:

$$\sigma^2 = \frac{1}{n}\sum_{i=1}^{n}\left(x_i - \mu\right)^2 \tag{10}$$

With the parameters set and given a one-sided confidence level of α , the confidence intervals are as follows:

$$\left(0, \mu + \mu_\alpha \frac{\sigma}{\sqrt{n}}\right) \tag{11}$$

If the amount of a few transactions in the account is too large and outside the confidence interval, these few financial transactions in the account are more suspicious and need to be further excavated.

Under the new method, it is difficult for money launderers to circumvent regulation due to changes in the mean and variance and subsequent changes in the confidence interval. But with the use of one-sided confidence intervals, this situation can be monitored in real time, eliminating money laundering by illegals. Although large amounts of transactions are easy to find, but many small amounts of money laundering activities are difficult to be detected, and many money laundering groups rely on this loophole, reduce the amount of deposits, to avoid the detection of transactions. In order to put an end to this phenomenon, it is necessary to detect the amount of similar amount of suspicion, in order to combat this kind of money laundering behavior. So the introduction of the absolute number of standards for control, the absolute number of standards is to set a good quantitative data. If lower than the standard is normal funds, if higher than the standard is abnormal funds. Due to the different types of capital transactions, there are also differences in the accounts of funds, so it is necessary to classify the accounts and forms of transactions, and make different combinations, so as to realize the detection of small amounts of abnormal behavior [20-21].

Set $\mathrm{Q}_{01}(k,m)$ as the upper limit of the absolute amount of storage of m currencies in a single transaction of a class k account node, and use $\mathrm{Q}_{02}{}^{(k,m)}$ to represent the upper limit of the absolute amount of transfer transactions of m currencies in a single transaction of a class k account node. If the stored quantity is greater than the upper limit of storage, the amount is proved to be problematic and will be in the scope of financial anomaly regulation, as shown in the following equation:

$$\left|Q_j^i(t)\right| \geq Q_{01}(k,m) \;\; j = 0, i \in [1,2,\ldots] or \; i = 0, \; j \in [1,2,\ldots] \tag{12}$$

If the amount of money transferred is greater than the upper limit of the transfer amount, the amount of money transferred is problematic and financial anomalies are regulated as a way to reduce money laundering, as shown in the following equation:

$$\left|Q_j^i(\mathrm{t})\right| \geq Q_{02}(k,m) \; i, \; j \in [1,2,\ldots]; i \neq j, t > 0 \tag{13}$$

Based on the above process, the identification and supervision of financial abnormal behavior is completed to reduce the risk of the financial industry and ensure the safety of people's property.

5. Artificial Intelligence-based Identification Test for Abnormal Behavior in Financial Markets

5.1 Analysis of the efficiency of monitoring financial market anomalies

Market anomaly monitoring builds were performed using different algorithms through different numbers of market anomalies and the time of market anomaly monitoring builds were counted. The time for market anomaly monitoring construction is shown in Table 1. The K-means method based on AI network is more efficient compared to the machine learning based method and the machine learning and traditional random wandering based method in identifying financial abnormal behaviors, which can be up to 100 seconds and 2M edges, while the machine learning based method

and the machine learning and traditional random wandering based method are around 500 seconds and 200 seconds, respectively, which is less efficient and can not identify the abnormal behaviors fast enough to out the abnormal behavior in the transaction and reduce the risk of people's property.

Table 1: Time/s for market anomaly monitoring constructs

Algorithms	Number of edges (in millions, M)				
	0	0.6	1.1	1.6	2.1
Machine Learning Based Approaches	0	20.21	37.83	54.82	62.99
Machine learning and traditional random walk based methods	0	433.84	>500	>500	>500
K-means methods based on artificial intelligence networks	0	81.37	133.71	171.69	192.51

5.2 Algorithm Memory Usage Analysis

Since different algorithms have different execution times and require different memory, the execution process is divided into four phases: initialization, graph construction, algorithm execution, and result storage, and shows the general memory usage in each phase. Figure 7 shows the memory consumed by different algorithm execution processes, the proposed method has a small memory footprint in different algorithm execution processes, and the memory footprint in the algorithm execution phase is improved by more than 70% compared to machine learning based and traditional random wandering methods. Artificial Intelligence nearly occupies 273 MB, which indicates that the proposed algorithm has a smaller memory footprint and has the ability to process larger data. And the faster processing speed can alert the people to the risks of financial transactions in time and reduce the cost.

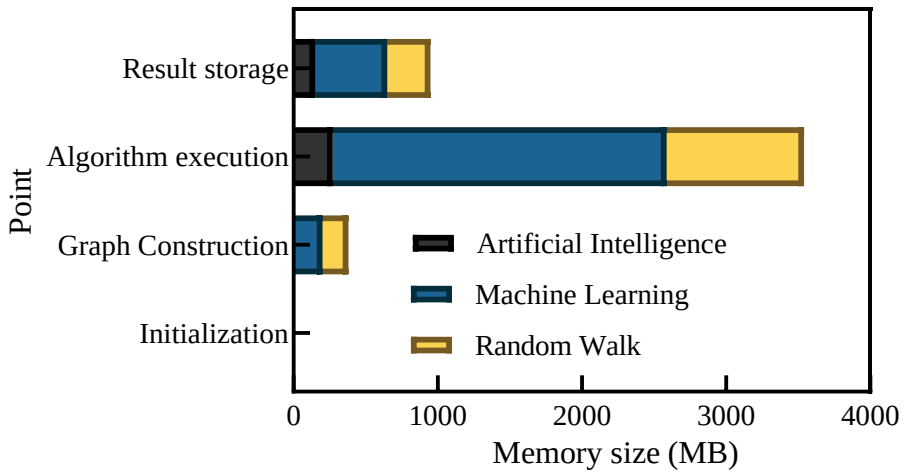

Figure 7: Memory consumed during execution of different algorithms

5.3 AI Accuracy Analysis

The extraction of some market anomalies is launched and the performance and effectiveness of the algorithms are tested by using accuracy assessment of the K-means algorithm based on Artificial Intelligence Networks, machine learning based and traditional random wandering methods and machine learning based methods. Table 2 shows the comparison of transaction prediction accuracy of different methods, the accuracy of K-means method based on artificial intelligence network is higher, the first time is around 83.11%, the second time is around 87.03%, the third time is around 81.35% and the average is 83.83%. And the accuracy of machine learning based and traditional random wandering methods for three times are 81.07%, 84.84% and 79.13% respectively, with an average of 81.68% The accuracy of machine learning based methods for three times are 80.97%, 82.33% and 78.81% respectively, with an average of 80.7%, which shows that the proposed algorithm is more accurate and can accurately identify the financial transactions of the abnormal behavior, maintain the positive development of the financial market, and enhance the ability of the financial sector to resist risks.

Table 2: Comparison of transaction prediction accuracy of different methods

Algorithms	Market anomaly monitoring dataset		
	1	2	3
Machine Learning Based Approaches	80.97 %	82.33%	78.81%
Machine learning and traditional random walk based methods	81.07 %	84.84%	79.13%
K-means methods based on artificial intelligence networks	83.11 %	87.03%	81.35%

6. CONCLUSION

Based on the characteristics of abnormal behavior and defense mode in financial transactions, this paper constructs an abnormal behavior identification model according to the transaction behavior in the financial field, identifies abnormal behavior in transactions, and improves the risk-resistant ability of financial transactions. From the three perspectives of identification efficiency, identification accuracy and algorithm memory, we analyze the effect of the model in identifying abnormal behavior in finance, and the results show that the AI algorithm is more accurate compared with the other two algorithms, and can reach about 83.83% on average, which can accurately identify the abnormality in financial transactions. Moreover, the artificial intelligence algorithm is more efficient and can identify abnormalities in financial transactions within 100 seconds, which is faster. In addition, the memory consumption in the execution phase of the algorithm is increased by more than 70% compared to other methods, occupying 273MB of memory. The results of the study prove that AI can alert people to financial transactions in a timely manner, safeguard people's property, and promote the development of a fair and transparent financial market.

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